

*Office of Coast Survey*



Promote Safe Navigation

# Objectives of OCS Mapping Effort

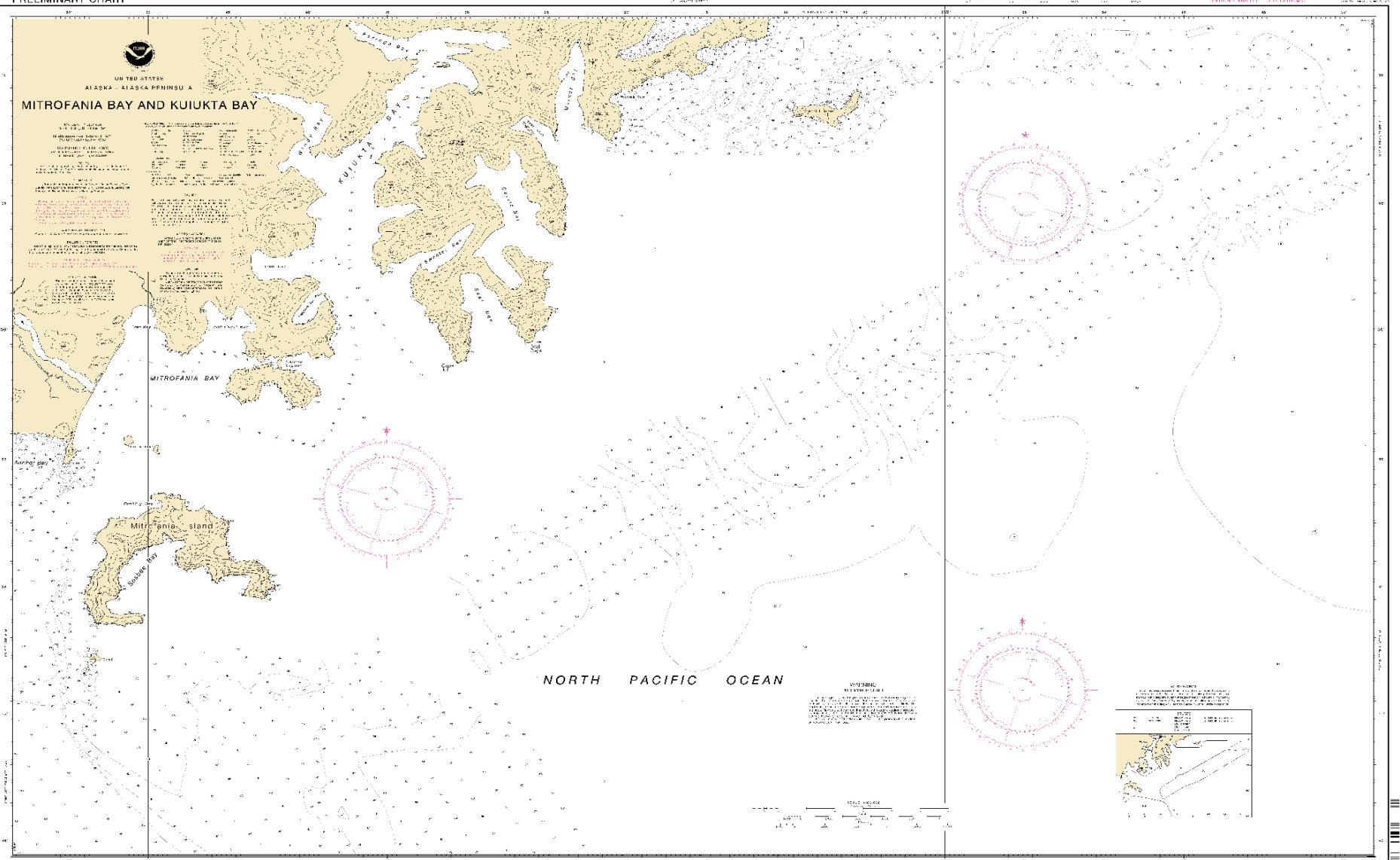
- Promote Safe Navigation
  - Determine accurate depths
  - Find hazards to navigation
    - rocks, wrecks, obstructions, well heads, etc.
  - Shoreline
  - Tides, currents

## PRELIMINARY CHART

16561

UNITED STATES  
ALASKA - ALASKA PENINSULA

## MITROFANIA BAY AND KUIUKTA BAY

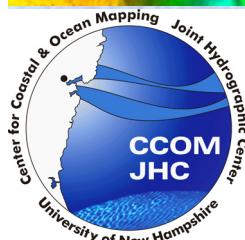
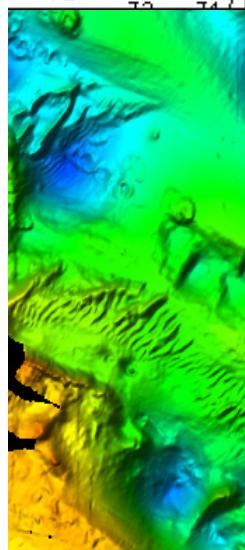
SOUNDINGS IN FATHOMS  
TIDES AND TIDE STREAMS

# Products and Outputs

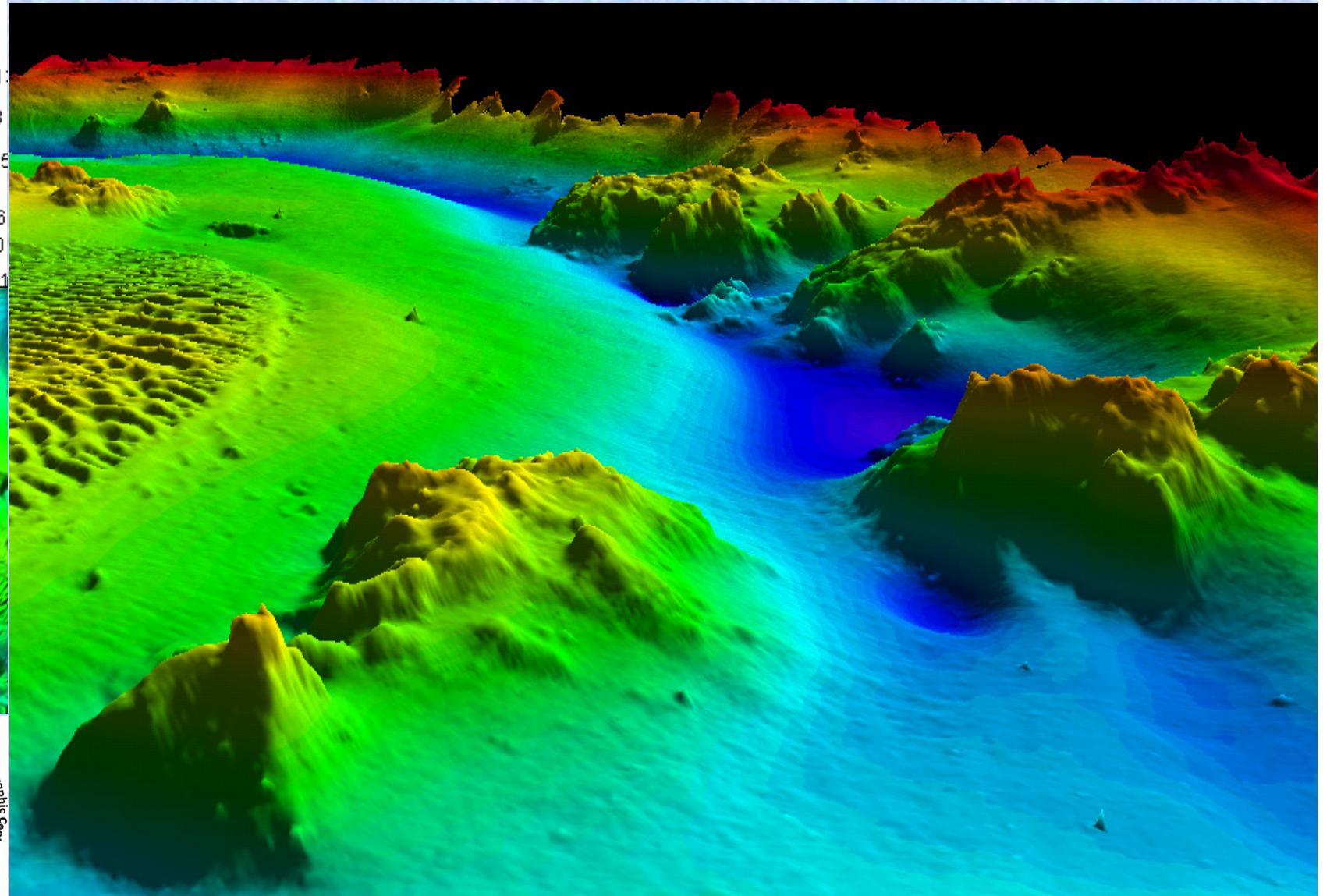
- Nautical Charts
  - Paper
  - ENC
- Smooth Sheets
- Navigation Surfaces
  - ‘gridded’ data sets
- Ancillary data
  - Tides, SVP, etc.



60 56 25 23  
50 58 66 68 43 7  
25 9 63 63 57 33  
60 61 59 36 21 14  
61 57 66 36 35 33  
72 63 60 47 33 35  
75 68 63 35 35 35  
74 72 72 73 67 60  
70 72 71 73 74 71

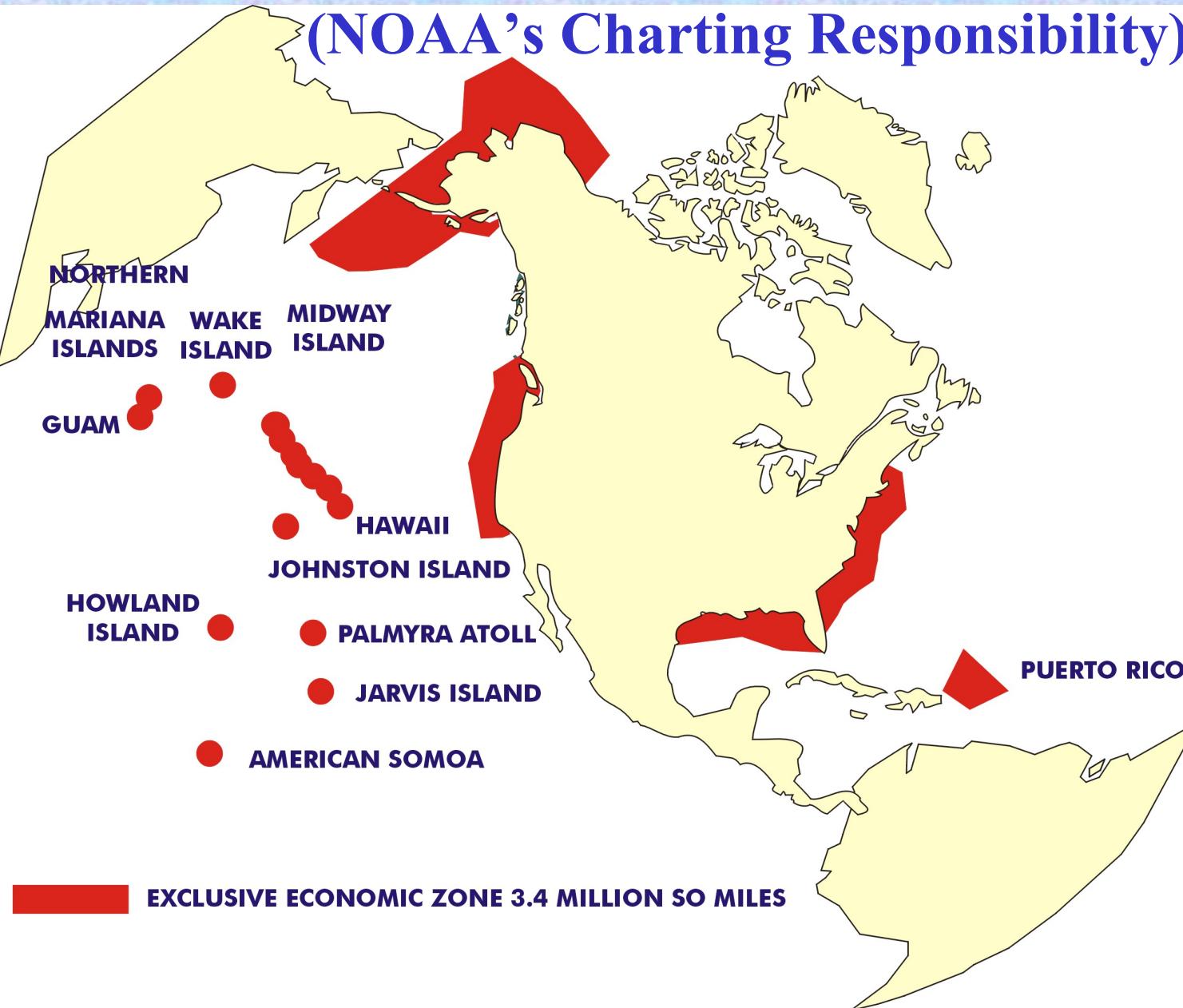


# High Resolution Gridded Data



# Spatial Priorities

(NOAA's Charting Responsibility)

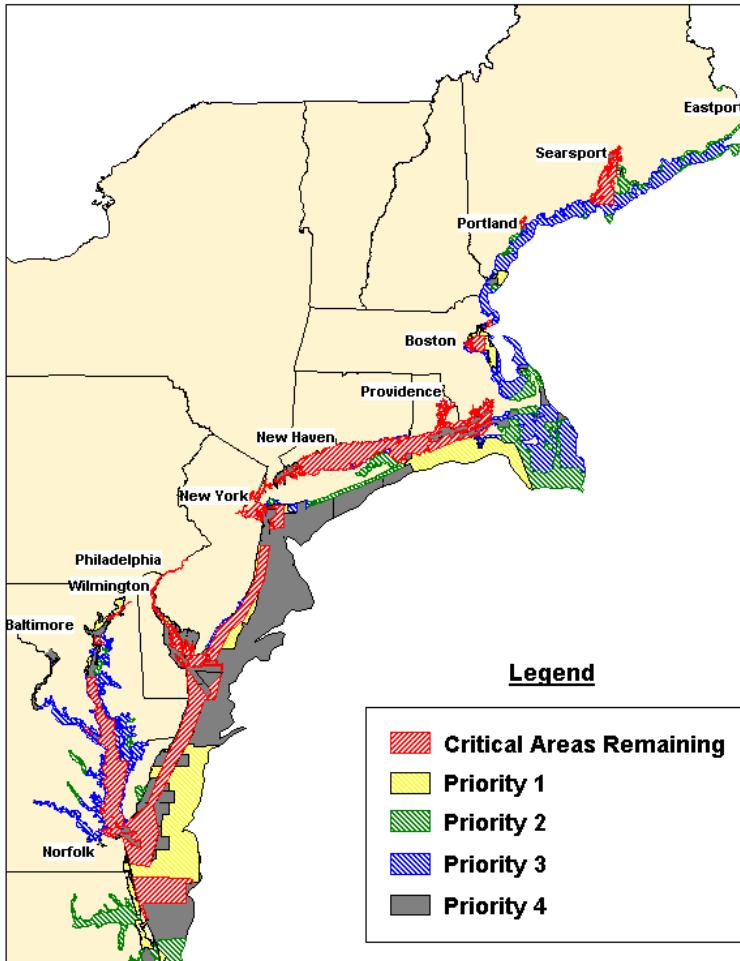


1,000  
Charts

# Priorities

## East Coast National Survey Plan

Northeast States  
November, 2000

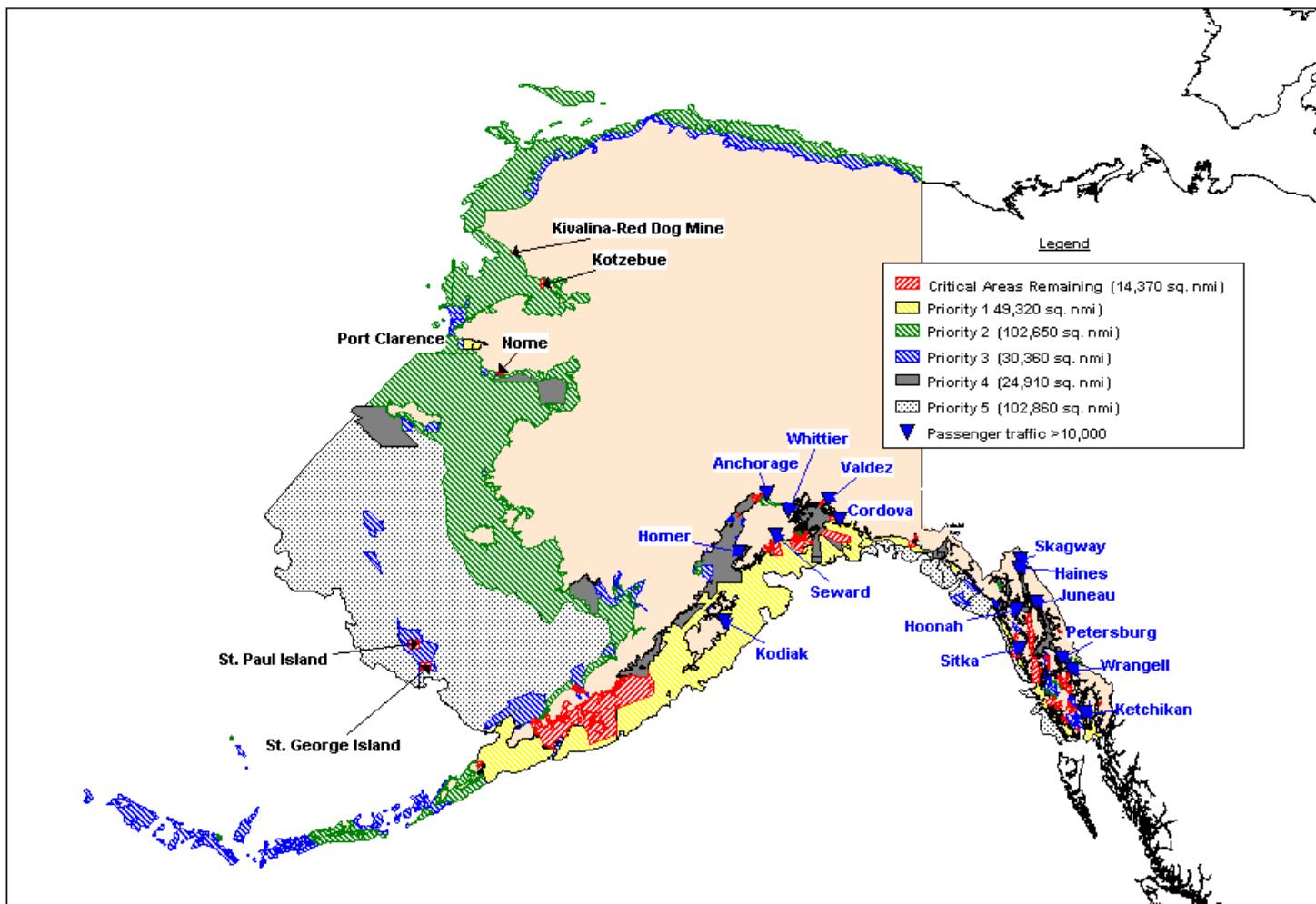


NCS31 11/09/2000 DAS

<http://chartmaker.ncd.noaa.gov/staff/NSP.html>

# Alaska National Survey Plan

November, 2000



INTERNATIONAL HYDROGRAPHIC ORGANIZATION



IHO STANDARDS FOR HYDROGRAPHIC SURVEYS

4<sup>th</sup> Edition, April 1998

Special Publication No. 44

Published by the  
International Hydrographic Bureau  
MONACO

<http://www.thsoa.org/pdf/s44.pdf>

# IHO Classifications

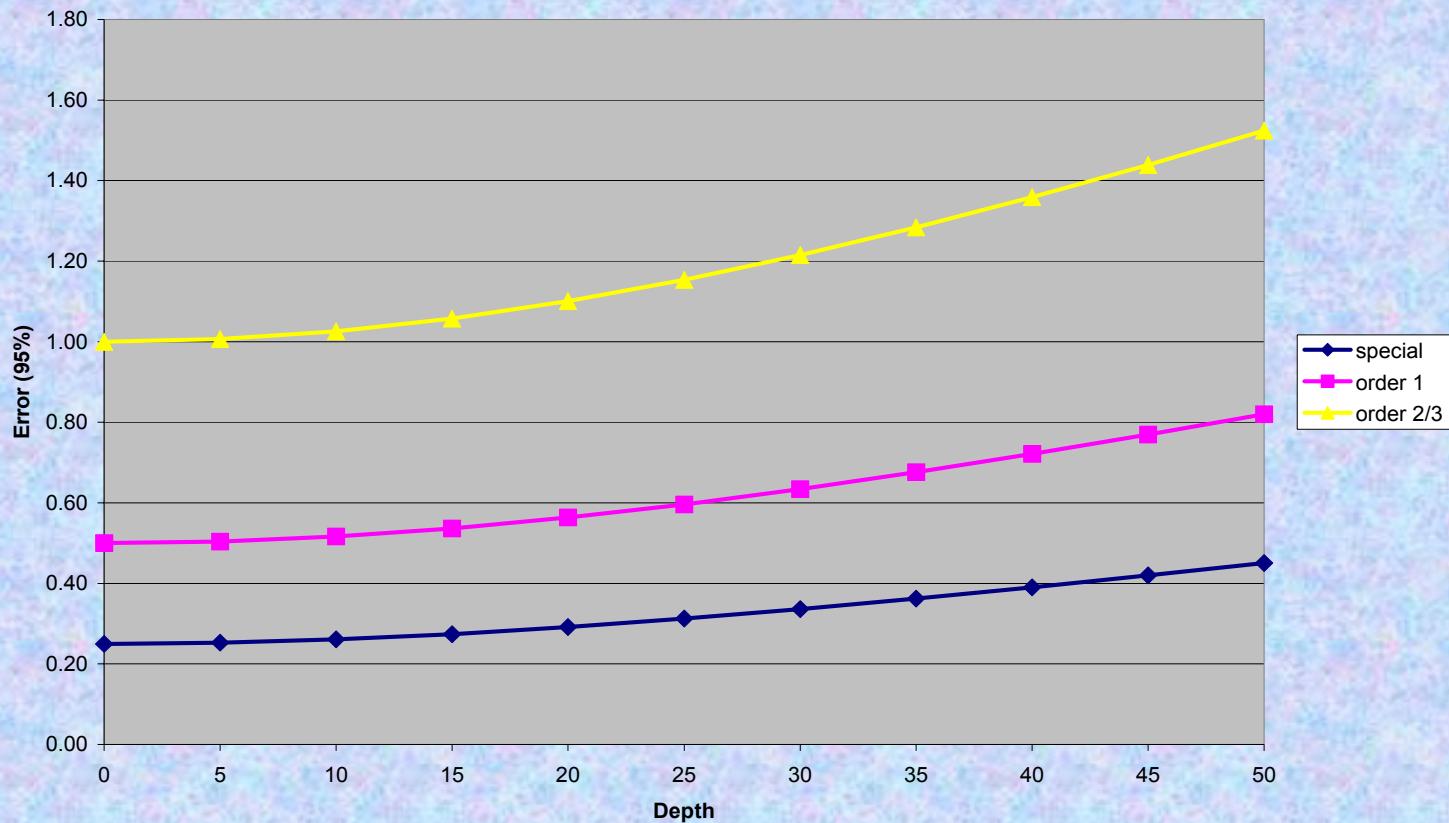
- Special Order
  - Approach engineering standards, intended to be restricted to specific critical areas.
- Order 1
  - Intended for harbors, approach channels and coastal areas of high commercial traffic density. Less than 100 meter depths.
- Order 2
  - Depths less than 200 meters. General description of the bathymetry is sufficient to ensure no dangers to vessel traffic.
- Order 3
  - Depths greater than 200 meters.

# Summary of IHO Minimum Standards

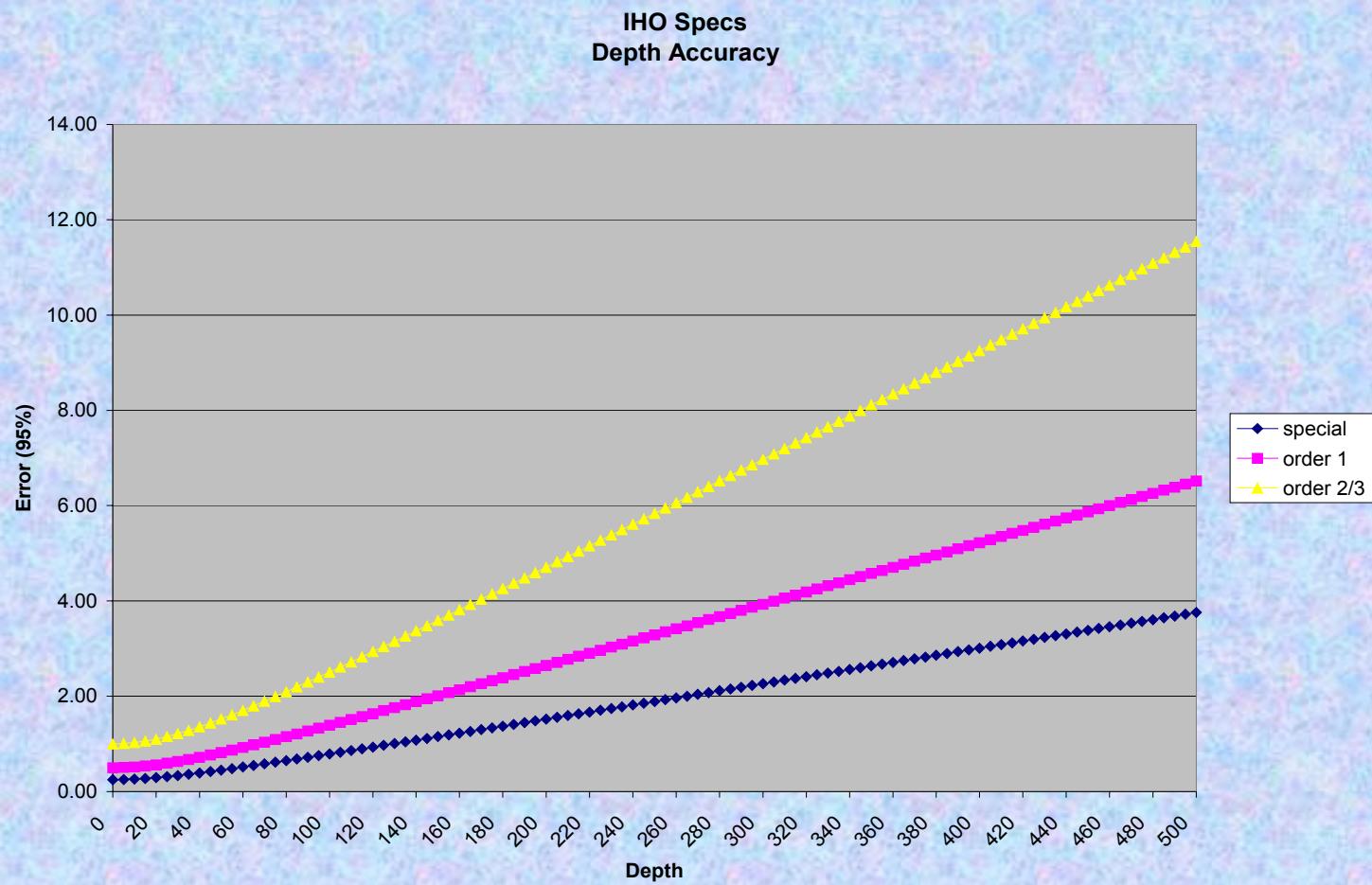
	Special	Order 1	Order 2	Order 3
Horizontal Accuracy (95% confidence)	2 meters	$5 M + 5\% \text{ of depth}$	$20 M + 5\% d$	$150 M + 5\% d$
Depth Accuracy (95% confidence)	$a = 0.25 \text{ m}$ $b = 0.0075$	$a = 0.5 \text{ m}$ $b = 0.013$	$a = 1.0 \text{ m}$ $b = 0.023$	Same as Order 2
100% bottom search	Compulsory	In selected areas only.	May be required, but not likely.	No
Item Detection Capability	Cubic features $> 1 M$	$> 2 M \text{ cubes in depths to } 40M, 10\% d \text{ beyond}$	Same as Order 1	Not Applicable
Maximum Line Spacing	N/A, 100% bottom coverage	$3 \times \text{avg depth or } 25 M, \text{ whichever is greater}$	$3-4 \times \text{avg depth or } 200 \text{ m, whichever is greater}$	$4 \times \text{avg depth}$

$$\text{SQRT}[a^2 + (b*d)^2]$$

IHO Specs  
Depth Accuracy



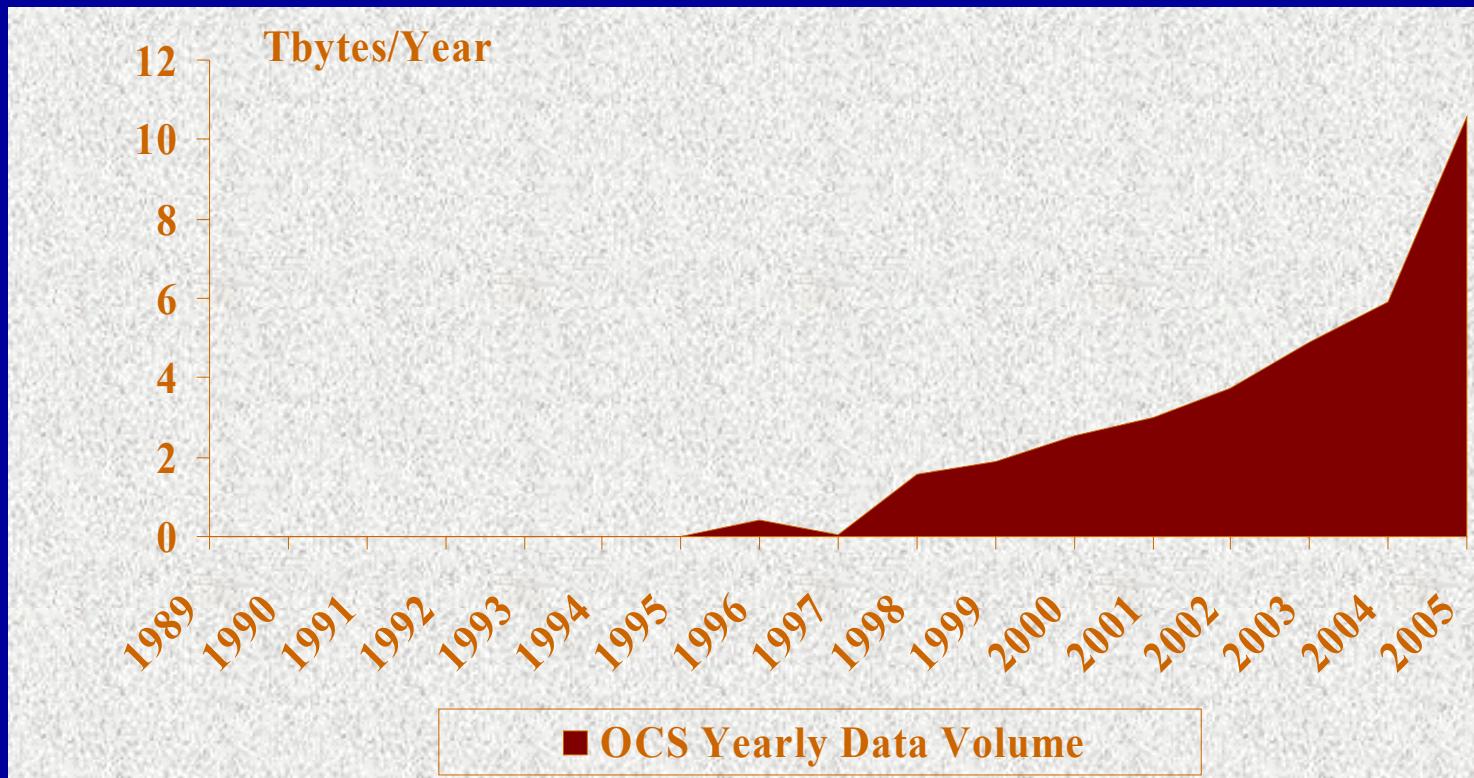
$$\text{SQRT}[a^2 + (b*d)^2]$$



# Methodology Error Sources

- Tides!!!
- Sound Velocity
- Equipment Integration
  - Motion Sensor, Positioning, Depth Sounder
  - offsets, patch test, timing, etc.
- Vessel Characteristics
  - Draft, Settlement/Squat.
- Processing

# Office of Coast Survey Yearly Data Volume for Nautical Chart Production



Note: Data volume is expected to increase significantly in the future due to the reactivation of the Fairweather, the use of time charters, LIDAR acquisition, SWATH vessel and advancements in technologies.

# Data Tsunami

- How to process
- What to archive and how
  - full resolution vs raw vs subset
- Distribute to other users
- Get it on the chart quickly



The End